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ABSTRACT

A review of the literature on job analysis and job evaluation reveals several aspects of jobs which are important to organizations. To better explain the psychological dimensions of the work environment, three models of perceived job characteristics were compared using confirmatory factor analysis: Walsh, Taber, and Beehr's (1980) components of information and action; Ryan's (1982) classification of environmental events into controlling and informational; and a third model based on an integration of the two previous models, including three dimensions: control, stimulus uncertainty (information processing amount), and response uncertainty (information processing equivicality). Employees of a private sector information processing organization (N=119) completed Likert-type questionnaires comprised of 58 items representing the 12 variables encompassed by the three models (e.g., decision making authority, leadership responsibilities, job complexity, information processing amount). Model one fit the data least well, with models two and three showing significant improvement in accounting for the covariances among the 12 variables. Stimulus and response uncertainty were found to be highly correlated, suggesting a hierarchical model in which control and information are significant dimensions of perceived job characteristics. Seventeen references are listed. (MCF)

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Control and Information: Underlying Psychological Dimensions of the Work Environment

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Abstract

Three models of perceived job characteristics were compared using confirmatory factor analysis. The first model was based on Walsh, Taber, and Beehr's (1980) components of information and action. The second model was based on Ryan's (1982) classification of environmental events into controlling and informational. The third model was based on an integration of the two previous models and includes three dimensions: control, stimulus uncertainty, and response uncertainty. Based on data obtained from employees of a private sector information processing organization (N = 119), evidence supported the latter two models (χ^2 = 184.23 with 53 degrees of freedom and χ^2 = 168.91 with 51 degrees of freedom, respectively.) Stimulus and response uncertainty were found to be highly correlated suggesting a hierarchical model in which control and information (stimulus and response uncertainty) are significant dimensions of perceived job characteristics.

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It has been suggested that the perception of one's work environment can be categorized into two psychological dimensions. Walsh, Taber, and Beehr (1980) proposed that perceived job characteristics can be categorized into information and action components. The action component represents the resources (materials, equipment, skills, and procedures) required to perform one's job and is characterized by one's perceptions of variety, autonomy, and challenge. The information component represents knowing what needs to be done, how to do it, and how well it is being done and is characterized by task identity and feedback.

Ryan (1982) also proposed a model in which environmental events could be characterized by two dimensions, controlling events and informational events. Environmental events are perceived as controlling to the extent that they are interpreted as attempts to coerce the performance of a specific behavior or class of behaviors. On the other hand, environmental events may be perceived as informational to the extent that they are perceived to provide behaviorally relevant information in the absence of pressure to attain a specific outcome.

These two models suggest somewhat different psychological structures for perceived job characteristics. Walsh et al. (1980) do not include a dimension of control. If it were present in their model, it would most likely be considered part of the action component along with autonomy. It would appear that control is a viable psychological dimension which should be retained given the theory and research supporting the importance of the perception of control (Batlis, 1980; Boal & Cummings, 1981; Fisher, 1978; Langer, 1983; Lee & Schuler, 1982; Phillips & Lord, 1980; Schuler, 1980; Ryan, 1982).

Both models do include an information component. In fact, following Daft and Macintosh's (1981) discussion of information processing, Walsh et al.'s (1980) components of information and action appear to be comparable to

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information processing equivocality and information processing amount, respectively. Daft and Macintosh (1981) argue that information processing demands must be differentiated as to the amount of information (the greater the amount of processing required the greater the stimulus uncertainty) and the equivocality or lack of analyzability of information (the greater the equivocality the greater the response uncertainty). Stimulus uncertainty or information processing amount is analogous to Walsh et al.'s action component while response uncertainty is analagous to the information component.

Therefore, while both models propose two-dimensional perceived job characteristics models, it appears that a three-dimensional model, integrating both Ryan and Walsh et al.'s propositions, would better explain the psychological dimensions of the perceived work environment. The three dimensions would be control, stimulus uncertainty or information processing amount, and response uncertainty or information processing equivocality.

A review of the literature on job analysis and job evaluation reveals several aspects of jobs which appear to be of importance to organizations (McCormick, 1976; Roberts & Glick, 1981; Rosenfeld & Thornton, 1976; Whithey, Daft, & Cooper, 1983). Among the job characteristics which appear to have broad applicability are decision making relative to the allocation of resources, people management, scheduling of one's own work, autonomy, task variety, skill level, use of written communication, problem solving, and availability of guidelines and procedures for carrying out tasks. Using these job characteristics, it is possible to test which of the models, Ryan or Walsh et al.'s two-dimensional model or the proposed integrated three-dimensional model, best accounts for the covariance among perceived job characteristics. Figure 1 reflects the hypothesized structures to be tested.

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Insert Figure 1 about here

Model I reflects the two-dimensional model based on Walsh, Taber, and Beehr (1980). The action component is reflected by the perceived authority of the job incumbent (decision making relative to resource allocation, people management activities, scheduling of one's own work, and autonomy), variety and skill level. The information component is reflected by written communication, information processing amount and equivocality, complexity of problems to be solved, analyzability of information upon which to base one's decisions, and the degree of standardization of guidelines and procedures for performing one's tasks.

Model II reflects the two-dimensional model suggested by Ryan (1982). Controlling events are manifested by the perceived aspects of authority while informational events are hypothesized to be manifested by the remaining perceived job characteristics.

Model III represents the integration of Models I and II. Control is indicated by the authority one perceives in allocating resources, people management, scheduling, and autonomy. Stimulus uncertainty is indicated by perceived variety, skill level, receipt of written communication, and the amount of information processing required. Response uncertainty is hypothesized to be reflected by the perceived complexity of problems to be solved, the analyzability of information upon which one's solutions must be made, the equivocality of information one must process, and the degree of formal guidelines and procedures existent for carrying out one's duties.

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Method

Sample

Data were obtained from 140 individuals employed by a large electronic information processing organization. These respondents were employed in a number of different jobs ranging from sales to manufacturing. Of these respondents, only those with complete responses to the variables of interest in this study were included in all subsequent analyses (N = 119).

Instrument

The questionnaire included 58 items representing the 12 variables shown in Figure 1. The items were similar to those found in existing scales (Daft & Mcintosh, 1981; James & Jones, 1980; Walsh, Taber, & Beehr, 1980; Whithey, Daft, & Cooper, 1983) or were written by the authors to reflect the particular job characteristic of interest. All items were measured on Likert-type scales. The number of items and indicators of internal consistency are shown in Table 1. Average inter-item correlations as well as coefficient alpha are shown as indicators of internal consistency since coefficient alpha can underestimate internal consistency when the number of items used in a scale is small (Lord & Novick, 1968).

Insert Table 1 about here

Decision making was measured by nine items describing the individual's authority to make decisions regarding the allocation of resources, time, money, and people. People management involved the person's perceived supervisory and leadership responsibilities. The scheduling scale addressed the individual's

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authority to schedule his/her own work and autonomy items were selected to describe the individual's authority to plan and conduct the duties of the job. Variety was measured by two items which asked the person to describe the extent to which there was variety in the events generating the work and the decisions required. Skill level addressed the range of skills used in the job and the degree of training and experience required to perform the job. Written communication was measured by two items which addressed the emphasis on written as opposed to verbal and informal communication and the degree to which the individual received information via written communication. Information processing amount and equivocality were measured by two scales. Information processing addressed the necessity for extensive information search and processing prior to making decisions or taking action, while equivocality items referred to the multiplicity of meaning and solutions for decisions. Complexity of problems included items designed to address the degree of difficulty in one's job, such as the extent to which the individual is required to plan and present complex ideas and proposals. Analyzability of information included items concerning the concreteness of solutions for problems faced in the job. These items were very similar in nature to that of the Standardization scale which addressed the degree to which the individual could rely on existing procedures to perform the tasks of the job. These two scales were reverse scored to reflect lack of analyzability and standardization.

Results

The zero-order correlation coefficients of the 12 variables are presented in Table 2. This correlation matrix was submitted to confirmatory factor analysis using LISREL IV (Joreskog & Sorbom, 1978). The maximum likelihood

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factor coefficients and the goodness-of-fit statistic for each model are shown in Table 3.

Insert Tables 2 and 3 about here

None of the hypothesized models were confirmed based on the chi-square statistic. Model I fit the data least well with Models II and III showing significant improvement in accounting for the covariances among the 12 variables. Using the chi-square difference test revealed no statistically significant difference between Models II and III.

An inspection of the residual matrix for Model III suggested that a revision to Model III in which autonomy was not restricted to load on control but rather stimulus uncertainty would improve the fit. This revised model was run and the results are shown in Table 3. This change significatnly improved the fit, decreasing the chi-square value 13.61 to a chi-square to degrees of freedom ratio of 3.3. Further revisions did not produce a better fitting model without including complex variables.

The correlations among the factors were significantly different from zero. In Model I, the action and information components were correlated .75. Model II yielded a correlation between information and control of .65. Control was correlated .57 and .67 with stimulus uncertainty and response uncertainty respectively in Model III. Stimulus and response uncertainty were correlated .84. This is almost twice the correlation found by Daft and Mcintosh (1981) between their scales of information processing amount and equivocality.

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Discussion

This study represents an initial attempt to compare Walsh, Taber, and Beehr's (1980) perceived job characteristics model with Ryan's (1982) categorization of environmental events. Based on the perceived job characteristics included in this study, the results suggest an integration of these two models better explains the covariance among the job characteristics.

These results can only be considered tentative. First, the analysis was performed based on a minimal sample size and may not be generalizable to jobs in other organizations, industries, or, for that matter, other jobs within the same organization. Also, the measures employed in this study, while having acceptable internal consistency, were not the same scales used in the development of the two models which were compared. In addition, error terms were assumed to be uncorrelated for the purposed of analysis. This assumption may not be fully warranted since all measures were obtained by a single method.

However, given the limitations of this study, it would appear that the dimensions of information and control may be the major dimensions by which individuals interpret and respond to their work environments. One's authority to make decisions relative to allocation of resources and scheduling one's own work activities as well as people management activities were consistently found to reflect an underlying dimension hypothesized to be that of control. While there was limited support that autonomy was indicative of control, the best-fitting model suggests autonomy is more indicative of stimulus uncertainty or information processing amount.

The best-fitting model suggests that the information dimension can be differentiated into stimulus uncertainty and response uncertainty. Stimulus uncertainty was indicated by autonomy, variety, skill level, written

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communication, and information processing amount. Autonomy, variety, and skill level had significantly greater parameter estimates than written communication and information processing amount. This may be a function of the lower reliability of the latter two scales or it could be indicative of a need to add another dimension.

Response uncertainty was indicated by the complexity of the problems one is faced with, the analyzability and equivocality of the informatin upon which one must make decisions, and the extent to which one can follow standards and procedures in carrying out one's tasks. Analyzability and standardization had significantly lower coefficients than did complexity and equivocality.

While stimulus and response uncertainty received support in this study, it was found that they were highly correlated. This suggests a hierarchical model in which stimulus uncertainty an response uncertainty are indicators of information. This higher-order model would be consistent with Ryan's (1982) categorization of perceived environmental events. The use of this two-dimensional model may be appropriate in some instances and would be more parsimonious. However, as Roberts and Glick (1981) point out, the most parsimonious explanation may not adequately describe job perceptions, especially if one is interested in relating these perceptions to behavior.

The models tested in this study all suggest that the underlying factors affect the related observed variables (James, Mulaik, & Brett, 1982). Therefore, it is suggested that the perception of control influences one's perceptions of authority in decision making, the degree of people management skills, and the extent to which one decides the schedule of work activities. Likewise, the perceptions of stimulus and response uncertainty influence the respective observed perceptions according to the model. The question arises as to whether this is a cognitive consistency phenomenon or whether the perception of the specific job characteristics influences one's perception of control and

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information. This is an unsettled issue of causal order and is related to how one's perceptions of the work environment are formed. Future research should begin to address this issue by including independent measures of job characteristics in addition to the job incumbents' perceptions.

In conclusion, this test of the underlying structure of perceived job characteristics has added evidence to support the position that the major psychological dimensions of the work environment are control and information (stimulus uncertainty and response uncertainty). Future research should include additional job characteristics as well as hypothesized antecedents and consequences to assess the relationships among these dimensions.

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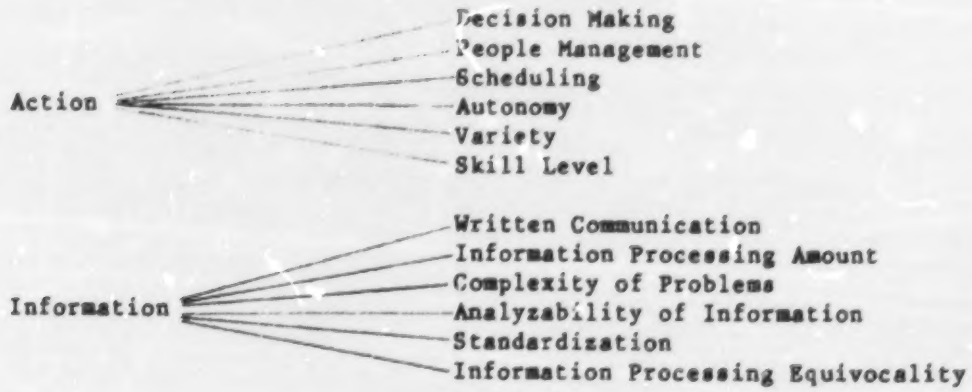
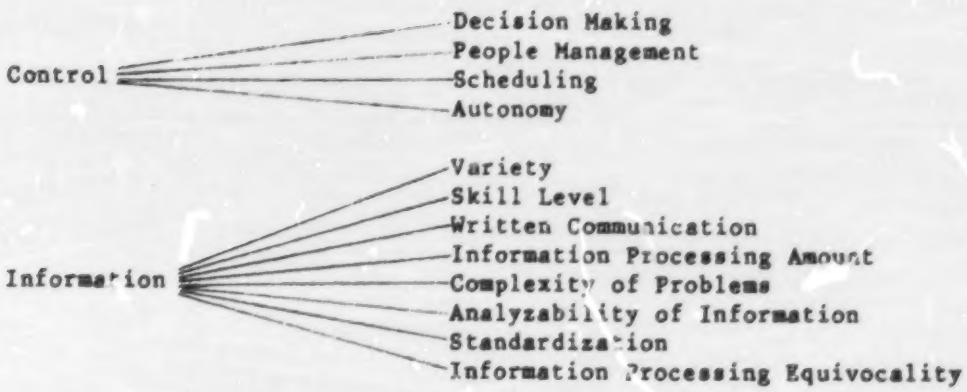
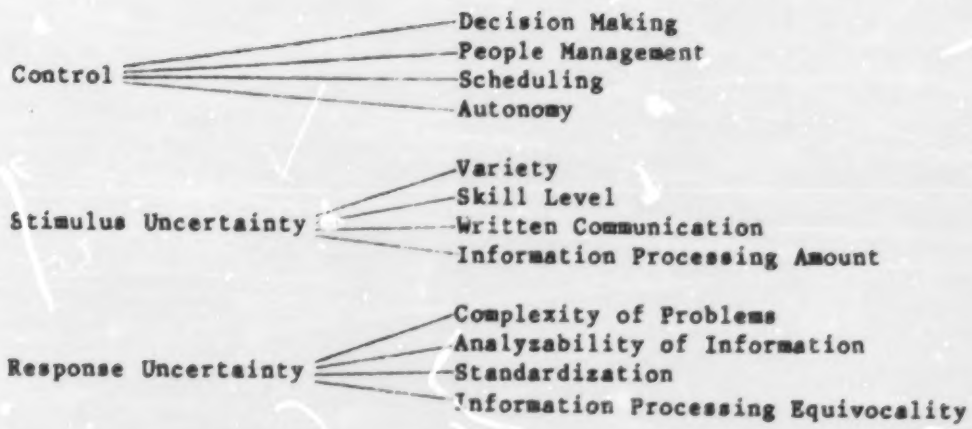
Figure I. Models of Perceived Job Characteristics



Model I



Model II



Model III

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Table 1

Descriptive Information for Variables

Variable	Number of Items	Coefficient Alpha	Average Inter-Item Correlation
1. Decision Making	9	.93	.62
2. People Management	9	.89	.50
3. Scheduling	3	.63	.41
4. Autonomy	4	.71	.38
5. Variety	2	.72	.57
6. Skill Level	2	.64	.47
7. Written Communication	2	.41	.27
8. Information Processing Amount	3	.62	.31
9. Complexity of Problems	11	.86	.38
10. Analyzability of Information	3	.62	.35
11. Standardization	6	.72	.31
12. Information Processing Equivocality	4	.59	.26

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Table 2

Correlations Among Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Decision Making	1.00											
2. People Management	.84	1.00										
3. Scheduling	.65	.51	1.00									
4. Autonomy	.37	.25	.55	1.00								
5. Variety	.39	.37	.17	.32	1.00							
6. Skill Level	.36	.34	.30	.41	.37	1.00						
7. Written Communication	.12	.15	.14	.20	.10	.18	1.00					
8. Information Processing Amount	.02	.06	-.00	.04	.16	.17	.25	1.00				
9. Complexity of Problems	.49	.45	.33	.31	.44	.56	.22	.32	1.00			
10. Analyzability of Information	.46	.40	.22	.14	.04	.02	-.07	-.14	.20	1.00		
11. Standardization	.36	.28	.3[illegible]	.27	.07	.17	-.23	-.20	.18	.49	1.00	
12 Information Processing Equivocality	.36	.31	.27	.34	.24	.38	.09	.08	.52	.23	.42	1.00

Table 3

Results of Confirmatory Factor Analysis

	Model I	Model II	Model III		Revised Model III	
			Stimulus	Response	Stimulus	Response
	Action Information	Control Information	Control Uncertainty	Uncertainty	Control Uncertainty	Uncertainty
1. Decision	.96	.98	.98		1.00	
2. People	.86	.85	.85		.84	
3. Schedule	.67	.66	.66		.65	
4. Autonomy	.41	.39	.39		.57	
5. Variety	.42	.52	.55		.55	
6. Skill	.41	.64	.69		.70	
7. Written	.15	.22	.24		.25	
8. IPA	.10	.25	.27		.22	
9. Complexity	.66	.83		.82		.77
10. Analyzability	.51	.30		.33		.37
11. Standardization	.51	.33		.36		.42
12. IPE	.63	.61		.62		.65
	χ^2 = 210.32 with 53 df	χ^2 = 184.23 with 53 df	χ^2 = 182.552 with 51 df		χ^2 = 168.94 with 51 df	